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AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/259,762

Filing Date: March 1, 1999

Title: OXYGEN PLASMA TREATMENT FOR NITRIDE SURFACE TO REDUCE PHOTO FOOTING

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REMARKS

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Applicant has carefully reviewed and considered the Office Action mailed on October 24, 2001, and the references cited therewith.

Claim 1 is amended. As a result, claims 1-3 and 5-11 remain pending in this application.

§102 and 103 Rejection of the Claims

Claims 1, 2, 5, and 9-11 were rejected under 35 USC § 102(e) as being anticipated by Puntambekar (U.S. Patent No. 5,821,603). The Puntambekar reference describes a method for roughening and hardening a silicon nitride film. The Puntambekar reference does not describe a method for reducing profile distortion without roughening a silicon nitride substrate surface. The claims of the present invention describe a process that is free of roughening of the silicon nitride film.

The Puntambekar reference is directed to reducing anisotropic etch and preventing “problems of voids” of the nitride layer. (Column 5, line 57). The roughening that is performed in the Puntambekar process is not desirable in the process of the present invention. Page 2, lines 15-17, of the present application describe that “achieving precise transfer requires that any surfaces overlaid by a photoresist be substantially free of discontinuities.” The process of Puntambekar actually makes discontinuities by roughening the surface.

In particular, the Puntambekar process employs oxygen at a rate of 0.5 to 15 sccm and an argon flowrate from 5 to 500 sccm in order to “remove a slight portion of the top surface of the photoresist layer 20, while simultaneously the argon ions roughen the upper surface of the photoresist layer.” Thus, the ranges of flowrate and gases described by the Puntambekar patent have been developed for the purpose of roughening the surface of the photoesist layer. This result is contrary to what is claimed and therefore, the Puntambekar reference does not anticipate claims 1-2, 5 and 9-11. To the contrary, the Puntambekar patent teaches away from claims 1-2, 5 and 9-11. The Examiner is citing TABLE II for support that the Puntambekar et al reference describes at oxygen flowrate of at least 300 sccm as acceptable. However, that is not what the patent states. Column 5, lines 47-49 state: “It is believed the following ranges for the foregoing parameters are acceptable: an oxygen flow rate ranging from 0.5-15 sccm..” This oxygen flow rate range, described in the patent as “acceptable” is a far cry from at least 300 sccm. The text of

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the patent does not explain or defend the oxygen flowrate in TABLE II. There is no reference that this flowrate is "acceptable."

The Puntambekar reference has an end result much different from what is claimed in the present invention. As has been discussed in previous correspondence, the claims of the present invention utilize an oxygen flowrate much greater than is described in the Puntambekar. The claims do not identify a use of argon in order to roughen the silicon nitride surface. This is no accident. The desired result of the present invention is a surface free of discontinuities. The desired result of the Puntambekar reference is a roughened surface. Thus, the Puntambekar reference does not render the present invention obvious.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6976 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 24 day of January, 2002.

Name

Tina Pugh

Signature

[Signature]

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